

DPP

DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Subject : PHYSICS
DPP No. : 5

Topic :-Nuclei

- A radioactive material has a half life of 10 days. What fraction of the material would remain after 30 days
a) 0.5 b) 0.25 c) 0.125 d) 0.33
- When a ${}^4\text{Be}^9$ atom is bombarded with α - particles, one of the products of nuclear transmutation is ${}^6\text{C}^{12}$. The other is
a) ${}_{-1}\text{e}^0$ b) ${}^1\text{H}^1$ c) ${}^1\text{D}^2$ d) ${}^0\text{n}^1$
- Fission of nuclei is possible because the binding energy per nucleon in them
a) Increases with mass number at high mass numbers
b) Decreases with mass number at high mass numbers
c) Increases with mass number at low mass numbers
d) Decreases with mass number at low mass numbers
- To explain his theory, Bohr used
a) Conservation of linear momentum b) Conservation of angular momentum
c) Conservation of quantum frequency d) Conservation of energy
- A radioactive nucleus emits a beta particle. The parent and daughter nuclei are
a) Isotopes b) Isotones c) Isomers d) Isobars
- Nuclear fission experiments show that the neutrons split the uranium nuclei into two fragments of about same size. This process is accompanied by the emission of several
a) Protons and positrons b) α -particles
c) Neutrons d) Protons and α -particles
- The shortest wavelength in the Lyman series of hydrogen spectrum is 912\AA corresponding to a photon energy of 13.6 eV . The shortest wavelength in the Balmer series is about
a) 3648\AA b) 8208\AA c) 1228\AA d) 6566\AA
- The rest energy of an electron is 0.511 MeV . The electron is accelerated from rest to a velocity $0.5c$. The change in its energy will be
a) 0.026 MeV b) 0.051 MeV c) 0.079 MeV d) 0.105 MeV
- In any fission process the ratio $\frac{\text{mass of fission products}}{\text{mass of parent nucleus}}$ is
a) Less than 1 b) greater than 1
c) Equal to 1 d) Depends on the mass of parent nucleus
- Half-life of a substance is 10 years. In what time, it becomes $\frac{1}{4}$ th part of the initial amount
a) 5 years b) 10 years c) 20 years d) None of these

11. α – particles of energy 400 KeV are bombarded on nucleus of $_{82}\text{Pb}$. In scattering of α – particles, its minimum distance from nucleus will be
 a) 0.59 nm b) 0.59 Å c) 5.9 pm d) 0.59 pm
12. K_{α} and K_{β} X-rays are emitted when there is a transition of electron between the levels
 a) $n = 2$ to $n = 1$ and $n = 3$ to $n = 1$ respectively
 b) $n = 2$ to $n = 1$ and $n = 3$ to $n = 2$ respectively
 c) $n = 3$ to $n = 2$ and $n = 4$ to $n = 2$ respectively
 d) $n = 3$ to $n = 2$ and $n = 4$ to $n = 3$ respectively
13. The ratio of the radii of the nuclei $_{13}\text{Al}^{27}$ and $_{52}\text{Te}^{125}$ is approximately
 a) 6:10 b) 13:52 c) 40:17 d) 14:73
14. The fraction of the initial number of radioactive nuclei which remain undecayed after half of a half-life of the radioactive sample is
 a) $\frac{1}{\sqrt{2}}$ b) $\frac{1}{2}$ c) $\frac{1}{2\sqrt{2}}$ d) $\frac{1}{4}$
15. The nucleus $_{48}^{115}\text{Cd}$ after two successive β^{-} decays will give
 a) $_{46}^{115}\text{Pa}$ b) $_{49}^{114}\text{In}$ c) $_{50}^{113}\text{Sn}$ d) $_{50}^{115}\text{Sn}$
16. A radioactive nucleus (initial mass number A and atomic number Z) emits 3 α – particles and 2 positrons. The ratio of number of neutrons to that of protons in the final nucleus will be
 a) $\frac{A - Z - 8}{Z - 4}$ b) $\frac{A - Z - 4}{Z - 8}$ c) $\frac{A - Z - 12}{Z - 4}$ d) $\frac{A - Z - 4}{Z - 2}$
17. Half-life of radioactive substance is 3.20 h. What is the time taken for a 75% of substance to be used?
 a) 6.38 h b) 12 h c) 4.18 day d) 1.2 day
18. The spectral series of the hydrogen atom that lies in the visible region of the electromagnetic spectrum
 a) Paschen b) Balmer c) Lyman d) Brackett
19. What is the particle x in the following nuclear reaction
 $_{4}^9\text{Be} + {}_2^4\text{He} \rightarrow {}_6^{12}\text{C} + x$
 a) Electron b) Proton c) Photon d) Neutron
20. The masses of two radioactive substances are same and their half-lives are 1 yr and 2 yr respectively. The ratio of their activities after 4 yr will be
 a) 1:4 b) 1:2 c) 1:3 d) 1:6